AIR FORCE RESEARCH LABORATORY [AFRL]

The Air Force Office of Scientific Research | The Basic Research Manager of the AFRL

Research HIGHLIGHTS

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Control Theory Used To Reduce Costs For Air Force Weapon Systems

Air Force use of new flight control system design tools are significantly cutting design and development costs for current operational and test munition weapon systems. AFOSR-sponsored researchers at the University of Illinois Urbana-Champaign (UIUC), working with engineers at The Boeing Phantom Works in St. Louis, have developed and transitioned the new design tools for the Joint Direct Attack Munition (JDAM) and Miniaturized Munitions Technology Demonstration (MMTD) smart weapons.

The JDAM (operational) and MMTD (in test) gravity bombs use Global Positioning System navigation to accurately guide the weapon to target. Affordability is the primary objective in these programs. The new flight control design technology played a key role in meeting this directive by enabling Boeing to design low-order, simple flight controllers which:

- minimized the number of sensors,
- reduced parts count, and
- reduced weight, while meeting restrictive packaging and volume constraints.

The new MMTD smart bomb has the same military effectiveness (in tests) against fixed hard and soft targets as

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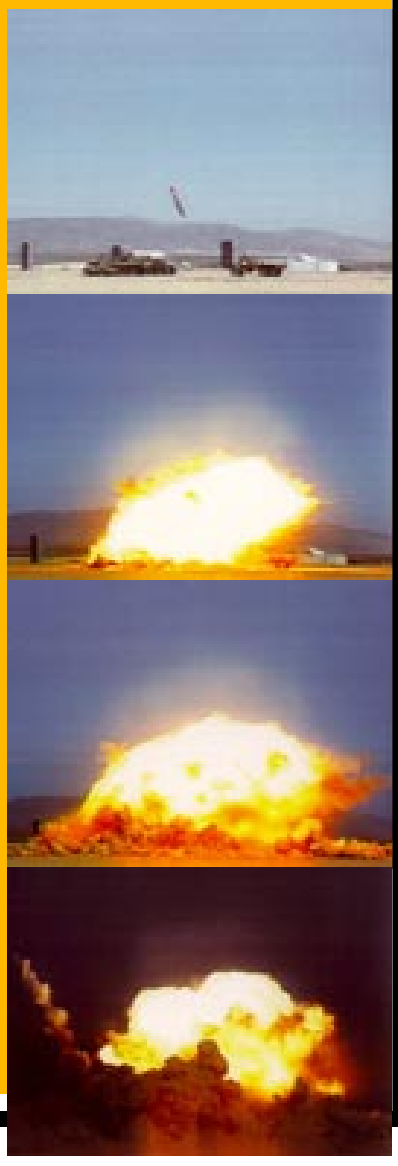
BELOW: Photo sequence showing JDAM test against ground mobile targets



Another AFOSR-Sponsored Researcher Wins Nobel Recognition

Prof. Daniel Tsui
Princeton University

At AFOSR, we're understandably proud of our track record of selecting world-class researchers to undertake the Air Force's technology challenges. This includes more than 30 Nobel Laureates in the fields of physics and chemistry supported by AFOSR prior to their recognition as a Nobel Laureate. In October, this trend continued with the announcement of Professor Daniel Tsui of Princeton University who shared in the 1998 Nobel Prize in Physics.

Dr. Tsui's award-winning "Fractional Quantum Hall effect" research was performed during his long career at Bell Labs. Subsequently at Princeton with AFOSR sponsorship, Dr. Tsui carried forward extensions of this work that will lead to miniaturized, high performance millimeter wave components used extensively in surveillance and communication systems. These smaller, faster components will play a key role in helping the Air Force to achieve its goals of 75 to 80 percent weight/volume reductions in electronic circuits early in the next century.

AFOSR congratulates Dr. Tsui and is proud to be associated with such highly recognized world-class scientific research.

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